REMARKS

This paper is being provided in response to the Office Action mailed December 29, 2004, for the above-referenced application. In this response, Applicants have amended claims 1, 3, 6 and 7 to clarify that which Applicants consider to be the invention. Applicants respectfully submit that the amendments to the claims are fully supported by the originally-filed specification.

Applicants thank the Examiner for the indication of allowable subject matter in claim 7. Applicants have rewritten claim 7 into independent form to incorporate the features of the base claim and any intervening claims. Accordingly, Applicants respectfully submit that this claim is in condition for allowance.

With respect to the objection to the Information Disclosure Statement previously filed on September 18, 2003, Applicants submit herewith a replacement copy of the PTO Form 1449 corresponding to the Information Disclosure Statement and cited references that were previously filed. Applicants respectfully request that the Examiner indicate his consideration of the references by initialing where appropriate on the PTO Form 1449 and return a signed copy of the form with the next communication to Applicants.

The rejection of claims 1-6 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,933,062 to Kommrusch (hereinafter "Kommrusch") is hereby traversed and reconsideration is respectfully requested in view of the amendments to the claims contained herein.

Independent claim 1, as amended herein, recites a ladder SAW filter. A first SAW resonator is disposed in a parallel arm. A second SAW resonator is disposed in a series arm. An inductor is connected parallel to at least one of the first SAW resonator and the second SAW resonator. The frequency of a resonance point or an anti-resonance point of the at least one of the first SAW resonator and the second SAW resonator is adjusted by the inductor to obtain desired filter characteristics. Claims 2-6 depend directly or indirectly on independent claim 1.

The Kommrusch reference discloses an acoustic wave ladder filter with an effectively increased coupling coefficient (k^2). (See col. 4, lines 42-64 of Kommrusch.) Kommrusch discloses that the effective coupling coefficient is increased by coupling an inductance to the SAW resonator. (See col. 4, line 64 to col. 5, line 20 of Kommrusch.) Further, according to col. 7, lines 1-12, 29-34 and 44-45, Kommrusch discloses that the inductance value of an inductive inverter added to the SAW resonator is set so that the resonator in the shunt section functions as a capacitance component (or an inverter circuit).

Applicants' independent claim 1, as amended herein, recites a ladder SAW filter that includes at least the features of an inductor connected parallel to at least one of a first SAW resonator disposed in a parallel arm and a second SAW resonator disposed in a series arm, *wherein frequency of a resonance point or an anti-resonance point of the at least one of the first and second SAW resonators is adjusted by the inductor to obtain desired filter characteristics.* Applicants have found that this configuration provides a SAW filter that can be designed with a large degree of freedom, can easily achieve desired filter characteristics and has its filter

characteristics adjustable in an assembling process. Applicants have found that a SAW resonator has an additional apparent resonance point or anti-resonance point in addition to the ordinal resonance point and anti-resonance point when an inductor having an adequate inductance is connected to the SAW resonance. (See, for example, page 2, line 17 to page 3, line 15 of the present specification.)

Applicants respectfully submit that Kommrusch does not teach or fairly suggest at least the above-noted features as claimed by Applicants. Specifically, Kommrusch does not disclose the adjustment of frequencies of a resonance and anti-resonance point by coupling and inductor to the SAW resonator. Applicants direct attention to Fig. 6 of Kommrusch which does not illustrate a change in the resonance and anti-resonance point frequencies by the addition of the inductor. Applicants submit that the inductance connected to the resonator of Kommrusch is too small to adjust the resonance point frequency.

In contrast to Kommrusch, Applicants' presently claimed invention provides a SAW filter with the above-noted filters that, as discussed above, can achieve easily desired and adjustable filter characteristics. As shown in Figs. 2A and 2B of the present application, a SAW resonator in a series arm has one anti-resonant point f_r and two resonant points f_p when an inductor is connected to the resonator in parallel. The frequencies of the resonance points vary as the inductance value of the inductor varies while the anti-resonance point is fixed. For purposes of explanation only, Applicants attach as an exhibit hereto FIG. A which illustrates a simulation result performed by the inventor. The simulation was performed for various inductance values of an inductor which was connected in parallel to a SAW resonator in a series

arm. As shown in FIG. A, the SAW resonator has an anti-resonance point and two resonance points. The frequencies of the two resonance points increase in response to a decrease in the inductance value while the frequency of the anti-resonance point is fixed.

Similarly, when an inductor is connected in series to a SAW resonator in a parallel arm (i.e. shunt arm), this SAW resonator has one anti-resonance point f_r and two resonant points f_p as shown in Figs. 4A and 4B of the present application. The frequencies of the two resonance points decrease in response to an increase in the inductance value while the frequency of the anti-resonance point is fixed. When an inductor is connected in series in a series arm, this SAW resonator has two anti-resonance points f_r and one resonance point f_p as shown in FIGS. 6A and 6B. The frequencies of the two anti-resonance points decrease in response to an increase in the inductance value while the frequency of the resonance point is fixed. When an inductor is connected in parallel to a SAW resonator in a parallel arm, this SAW resonator has two anti-resonance points f_r and one resonance point f_p as shown in FIGS. 7A and 7B. The frequencies of the two anti-resonance points increase in response to a decrease in the inductance value while the frequency of the resonance point is fixed.

As described on page 5, line 5 to page 6, line 14 of the specification, a SAW ladder filter having desired filter characteristics can be obtained by arranging the resonance points and anti-resonance points of the resonators in the passband and attenuation pole. Attached as an exhibit hereto for purposes of explanation only is FIG. B which illustrates an example of a ladder filter shown in FIG. 1 of the present application. In FIG. B, calculated frequency characteristics of the SAW resonators constituting the ladder filter are illustrated. Further, FIG. C also attached hereto

as an explanatory exhibit, illustrates the overall filter characteristics of the ladder filter shown in FIG. B. The upper-left graph in FIG. C shows filter characteristics when external inductors are not connected to the SAW resonators in the circuit shown in FIG. 1 of the present application. FIG. C illustrates the advantages offered by the presently claimed invention of a ladder SAW filter having desired filter characteristics that can be easily obtained.

Since Kommrusch does not teach or fairly suggest the adjustment of the frequencies of the resonance point and anti-resonance point by coupling an inductor to the SAW resonator, Applicants respectfully submit that Kommrusch does not render as obvious the presently claimed invention. Accordingly, Applicants respectfully request that this rejection be reconsidered and withdrawn.

Based on the above, Applicants respectfully request that the Examiner reconsider and withdraw all outstanding rejections and objections. Favorable consideration and allowance are earnestly solicited. Should there be any questions after reviewing this paper, the Examiner is invited to contact the undersigned at 617-248-4038.

Respectfully submitted,
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U.S. PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	AA						
	AB						
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FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	Translation YES	Translation NO
	AL	0 541 284 A1	10/27/1992	EPO				
	AM	5-183380	07/23/1993	Japan			(Abstract)	
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